

Claims

1. A powdery, water-soluble, cationic polymer composition that contains at least two cationic polymers of different composition in the cationic groups, wherein a first cationic polymer is formed by radical polymerization of its monomer constituents in the presence of a second cationic polymer in aqueous solution,
characterized in that
 - the polymerization of the first cationic polymer takes place in an aqueous solution of the second cationic polymer according to the method of adiabatic gel polymerization.
2. A composition according to claim 1, characterized in that the ratio of the second to the first cationic polymer lies between 0.01:10 and 1:4.
3. A composition according to claim 1 and 2, characterized in that the first cationic polymer has a weight-average molecular weight higher than 1 million.
4. A composition according to claim 1 to 3, characterized in that the second cationic polymer has a weight-average molecular weight lower than 1 million.
5. A composition according to claim 1 to 3, characterized in that the first cationic polymer is formed using cationic monomers selected from the group of cationized esters and amides of (meth)acrylic acid, in each case containing a quaternized N atom, preferably quaternized dimethylaminopropylacrylamide and quaternized dimethylaminoethyl acrylate.

6. A composition according to claim 1, 2 and 4, characterized in that the second cationic polymer is formed using cationic monomers selected from the group comprising diallyldimethylammonium chloride and the cationized esters and amides of (meth)acrylic acid, in each case containing a quaternized N atom, preferably quaternized dimethylaminopropylacrylamide, quaternized dimethylaminoethyl acrylate and or diallyldimethylammonium chloride.
7. A composition according to claim 5 and 6, characterized in that copolymerized with further, nonionic water-soluble monomers, preferably with acrylamide.
8. A composition according to claim 1 to 7, characterized in that the first cationic polymer is composed of 20 to 90 wt% of cationic monomers.
9. A composition according to claim 1 to 8, characterized in that the second cationic polymer is composed of 70 to 100 wt% of cationic monomers.
10. A composition according to claim 1 to 7, characterized in that the first cationic polymer has a lower charge density than the second cationic polymer.
11. A method for producing polymer compositions according to claim 1 to 10, which polymers contain at least two cationic polymers of different composition in the cationic groups, wherein a first cationic polymer is subjected to radical polymerization by adiabatic gel polymerization of its monomer constituents in the presence of a second cationic polymer in aqueous solution,
characterized in that

- the aqueous solution of cationic monomers and the second cationic polymer is prepared with a concentration of 10 to 60 wt%, the start temperature for the polymerization is adjusted to a range of -10°C to 25°C, and oxygen is purged by an inert gas,
- the exothermic polymerization reaction of the monomers is started by addition of a polymerization initiator, and heating of the polymerization mixture takes place with formation of a polymer gel up to its maximum temperature,
- after the maximum temperature has been reached, the polymer gel is subjected to mechanical size reduction and to drying.

12. A method according to claim 11, characterized in that the start temperature of polymerization is adjusted to a range of 0°C to 15°C.

13. A method according to claim 11 and 12, characterized in that the concentration of the aqueous solution of monomers and the second cationic polymer is 15 to 50 wt%.

14. A method according to claim 11 to 13, characterized in that the polymerization initiator comprises a redox system or a system that can be activated by UV radiation.

15. A method according to claim 11 to 14, characterized in that the polymerization is carried out on a polymerization belt.

16. A method according to claim 11 to 15, characterized in that, after size reduction, the aqueous polymer gel is dried at temperatures of 80°C to 120°C to a moisture content of less than or equal to 12.

17. The use of the polymers according to claim 1 to 10 as flocculation auxiliaries for solid/liquid separation.

18. The use according to claim 17 for purification of wastewaters and for conditioning of potable water.

19. The use according to claim 17 during paper manufacture.